

What is claimed is:

1. An apparatus for compensating for a phase difference in a system which transmits a plurality of signals according to time division multiplexing, the apparatus comprising:

- a phase transition filter group comprising a number of phase transition
- 5 filters equal to the number of the plurality of signals, where based on phase information each of said phase transition filters performs filtering to generate a signal having a phase altered with respect to an input signal; and

- a multiplexing unit operable to provide the phase information and for time division multiplexing the plurality of signals transmitted from the phase transition
- 10 filter group, where the phase information is assigned to each of the plurality of signals according to the time division multiplexing and to the phase transition filter group .

2. The apparatus of claim 1, wherein each of said phase transition filters, comprises:

- a plurality of delay units operable to delay the input signal;
- a plurality of coefficient storage units operable to store coefficients;
- 5 a first multiplier operable to multiply a current input signal by a first coefficient supplied by a first coefficient storage unit;

second multipliers operable to multiply signals output from the delay units by respective coefficients supplied by second through mth coefficient storage units;

- 10 an adder operable to add signals output from the first and second multipliers; and

 a coefficient supplier operable to supply the coefficients such that a coefficient of a corresponding filter tap is supplied to first through mth coefficient storage units.

3. The apparatus of claim 1, wherein the multiplexing unit comprises:

 a transmitter for dividing the plurality of signals based on a time domain and for transmitting the divided plurality of signals;

- a selection signal generator operable to generate a selection signal for
5 controlling a selection operation of the transmitter with respect to the plurality of signals; and

- a phase information generator operable to generate predetermined phase information in response to the selection signal from the selection signal generator and transmitting the predetermined phase information to the phase transition filter
10 group.

4. The apparatus of claim 3 wherein the multiplexing unit further comprises:

 a counter group having a plurality of counters;

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a demultiplexer which responds to the selection signal by transmitting
5 information to one of the counters in the counter group; and

a register group which provides the delay information assigned to the
signal during the time division multiplexing so that the delay information can be
compared, by the counter group, with a count value provided from said counter
group;

10 each of said counters responding to the demultiplexer by performing
counting and outputting a sample hold signal.

5. The apparatus of claim 3, wherein the phase information generator
changes the predetermined phase information according to delay information and
transmits the changed predetermined phase information to the phase transition
filter group, when the delay information is set in advance.

6. The apparatus of claim 1, wherein each of the phase transition filters
comprises a coefficient supplier for storing the coefficients of individual filter
taps for each piece of the phase information and outputting filter tap coefficients
corresponding to the received predetermined phase information, so that filtering
5 is performed on an input signal.

7. The apparatus of claim 6, wherein the coefficient supplier is
configured as a table with as many filter coefficients as the number of filter taps
for each piece of phase information.

8. An apparatus for compensating for a phase in a transmitting system which time division multiplexes a plurality of digital signals and converts a result signal into an analog signal, the apparatus comprising:

a signal generation logic unit group having a plurality of signal generation
5 logic units, where each of the signal generation logic units generates a predetermined digital signal;

a phase transition filter group comprising a number of phase transition
filters equal to the number of the plurality of digital signals, where each of the
phase transition filters performs filtering to generate a signal having a phase
10 transited with respect to an input digital signal based on phase information;

a multiplexing unit for providing the phase information, which is assigned
to each of the plurality of digital signals according to time division multiplexing,
to the phase transition filter group and time division multiplexing the plurality of
digital signals transmitted from the phase transition filter group and outputting a
15 time domain multiplexed signal;

a controller operable to provide a control signal, comprising arrangement
information of the plurality of digital signals and delay information for each of
the plurality of digital signals, to the multiplexing unit in order to control the time
division multiplexing;

20 a digital-to-analog converter for converting the time division multiplexed
digital signal output from the multiplexing unit into an analog signal;

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a sampling and holding unit group comprising a number of sampling and holding units equal to the number of the plurality of digital signals, each of the sampling and holding units operable to sample a corresponding signal from the analog signal output from the digital-to-analog converter and hold the sampled signal in response to a sample hold signal which is generated by the multiplexing unit; and

a low-pass filter group comprising a number of low-pass filters equal to the number of sampling and holding units, the low-pass filters low-pass filtering the sampled and held signals output from the sampling and holding units and outputting analog signals having a phase relation which is the same as the phase relation among the plurality of digital signals at a point of generation.

9. A method for compensating for a phase difference in a system which transmits a plurality of signals according to time division multiplexing, the method comprising:

generating a selection signal for the time division multiplexing of the plurality of signals;

generating predetermined phase information for each of the signals to be selected by the selection signal;

performing phase transition on each of the signals and outputting the result when it is determined that one of the signals needs to be subjected to the phase transition based on the predetermined phase information and outputting each of the signals unchanged when it is determined that the signals do not need

to be subjected to the phase transition based on the predetermined phase information; and

- time division multiplexing the signal or signals which have been
- 15 subjected to the phase transition and the signal or signals which have not been subjected to the phase transition and transmitting a time division multiplexed signal.

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